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THE MORTALITY FROM ALCOHOL IN
THE UNITED STATES

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THE MORTALITY FROM ALCOHOL IN THE UNITED STATES

THE RESULTS OF A RECENT INVESTIGATION OF THE CON-
TRIBUTORY RELATION OF ALCOHOL WITH
EACH OF THE ASSIGNED CAUSES
OF ADULT MORTALITY

BY

✓
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in the Mortality of Suicide and Crime, A Statistical Study
of Infant Mortality, Infant Mortality and Its Rela-
tion to Woman's Employment, Etc.*

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Reprinted from the Transactions of the Fifteenth International
Congress on Hygiene and Demography, held at
Washington, D. C., September 23-28, 1912

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Annex

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THE MORTALITY FROM ALCOHOL IN THE UNITED STATES—THE RESULTS OF A RE- CENT INVESTIGATION OF THE CON- TRIBUTORY RELATION OF ALCOHOL WITH EACH OF THE ASSIGNED CAUSES OF ADULT MORTALITY

INTRODUCTION

ON February 2, 1911, Capt. Richmond P. Hobson, of *Merrimac* fame and of late years a Member of Congress from Alabama, announced on the floor of the House of Representatives his intention of printing in the proceedings a lecture of his on the subject of the effects of alcohol, and this lecture has since been reprinted from the Congressional Record under the title of "The Great Destroyer," has been widely circulated, and has been extensively quoted in public addresses by ministers, physicians, and prohibition advocates. In this speech Capt. Hobson cited alleged English statistics of mortality due to alcohol, undertook to apply them to this country, and thus arrived at the conclusion that "over 680,000 deaths per year in continental United States" are due to alcohol, and that "alcohol is killing our people at the rate of nearly 2,000 men a day every day in the year, as many Americans every year as all the wars of the world have killed in battle in 2,300 years."

At the time of the delivery of this speech by Capt. Hobson the latest available mortality statistics of the United States were those for the calendar year 1909, which were presented in Bulletin 108, then recently issued by the Bureau of the Census. According to this bulletin, the total number of deaths of both sexes, at all ages, from all causes, in the registration area of the United States in 1909 was 732,538. Assuming that this death rate for the 55.3 per cent. of the population of continental United States included in the registration area was representative of the country at large, this figure would predicate a total

mortality of 1,324,662 for the entire country. With this tentative figure as a basis of calculation, Capt. Hobson's assertion that alcohol was responsible for "over 680,000 deaths per year in continental United States" would indicate that 51.3 per cent. of all deaths, at all ages, from all causes, in the United States were due to the single factor of alcohol. Even were the presumptive total mortality of the country calculated by doubling the recorded mortality of the registration area—as some statisticians believe should be done, in order to allow for the higher negro mortality of the Southern States not included in the registration area—the total mortality of the United States in 1909 would have been but 1,465,076, and the alleged mortality due to alcohol would have amounted to 46.4 per cent. of this total. In short, Capt. Hobson's positive assertion that more than 680,000 deaths in the United States each year were due to alcohol could only be regarded as a declaration that alcohol was annually responsible for approximately one-half of the total mortality of the United States at all ages and from all causes.

The preposterous nature of any such declaration, of course, is apparent on its very face, and I confidently venture the opinion that no man of unbiased mind and ordinary reasoning powers could regard such a statement as entitled to serious consideration. Mark Twain once grotesquely termed the rumor of his death "grossly exaggerated," and Capt. Hobson's statement was of like order. That fact was apparent, and the figure named literally fell by its own weight; but by way of natural sequence there followed the question, to what extent is this figure of 680,000 deaths per year from alcohol in the United States an exaggeration, or, in other words, about how many deaths in this country each year are presumably due to alcohol? No answer to this question was to be found in official figures, the only direct clues in the vital statistics of the Bureau of the Census and the various State and municipal mortality records being the meager returns for deaths directly due to alcoholism, delirium tremens, or the immediate effects of alcohol otherwise classified.

In the last 60 years there have been at least three more or less exhaustive scientific investigations of English mortality

due to alcohol, but up to 1911 no investigation worthy of the name in this country, in so far as I was able to ascertain from this country's bibliography of alcohol or by correspondence with some of its principal authorities. In view of the importance and far-reaching ramifications of the subject, and the apparent lack of any credible figures, either official or unofficial, it seemed high time that a pioneer effort on these lines should be made. With the kind cooperation of certain eminent medical authorities hereinafter named, I accordingly made the effort in question and published the results of my investigation in book form, under the title of "The Mortality of Alcohol—A Statistical Approximation of the Deaths in the United States in Which Alcohol May Figure as a Causative or Contributory Factor."

THE COMPLEX NATURE OF THE PROBLEM

The physiological and pathogenic influences of alcohol are a profound, complex, and preeminently debatable problem on which perhaps no two minds, either lay or medical, ever have been in entire accord. Even were every adult death immediately followed by an autopsy there doubtless would be a great many cases of difference of expert medical opinion as to whether in these specific instances alcohol had or had not played any appreciable part in causing death. And surely, in case of a large minority—if not, indeed, in a majority—of deaths nothing short of an autopsy could positively determine the actual importance of alcohol as a mortality factor. For these reasons it is apparent that no man who could authoritatively say precisely how many deaths are directly or indirectly due to alcohol now lives, ever has lived, or ever will live. At best the statistics of the subject, however credible and carefully compiled, can be but mere approximations.

Ruskin made the profound observation that "the work of science is to substitute facts for appearances and demonstrations for impressions," and, measured by these standards, perhaps no approximation of the mortality of alcohol could be regarded as strictly scientific. The most carefully worked-out approximation is open to debate; and facts are not debatable. The subject of alcohol and its use and abuse being one of the

most hotly debated topics of modern times, it is patent that no attempt at a serious approximation of the deaths due to alcohol would be received with unanimous approval, whatever the character of its showings. On undertaking the work of trying to arrive at such an approximation by the most promising processes available, I clearly foresaw that any man on publishing to the world the results of his investigation would be confronted with the pleasant choice of the Scylla of prohibition disapproval, or the Charybdis of antiprohibition dissent, according as the resultant figures might prove lower than the former, or higher than the latter, would wish to have them. Some such option is generally one of the prices which must be paid for pioneer work in any field of wide public interest, however, and having secured the necessary expert cooperation I entered on the proposed work without either prejudice or suspicion as to its outcome in the way of high or low figures in the approximation of the mortality of alcohol thus deduced—and, I might add, with complete indifference as to the particular horn of the dilemma on which I was destined to be impaled.

To the best of my knowledge, not even a semblance of official figures purporting to present the total number of deaths in which alcohol has played a causative or contributory part in the mortality of the United States now is, or ever has been, obtainable. The returns for deaths due to alcoholism, delirium tremens, etc., of course constitute but one item of that mortality. In Switzerland, as I understand, for several years the official death returns for the cities have been supplemented with confidential reports in cases of adult mortality in which alcohol was a contributory cause of death in the judgment of the attending physician, thus affording at least some means of officially computing the adult urban mortality in which alcohol supposedly figures. As those familiar with "the Budapest system" are aware, the secondary causes of death are entered in the official mortality statistics of that city. With these two exceptions, there are no mortality statistics in any country, in so far as I have been able to learn, which could be regarded as an official measure of the mortality directly or indirectly due to alcohol. It was therefore apparent at the very outset that any investigation of the subject in this country under

present conditions must necessarily be entirely without the domain of official statistics. Whence, then, were any figures entitled to serious credence to be sought? That was the first and foremost of the many questions involved.

The subject of the proposed inquiry being so pronouncedly pathologic, obviously the desired information could be obtained only from the medical profession. But from what branch or class of that profession could reliable data be expected? And taking into account the dearth of even unofficial medical records of deaths in the United States in which alcohol had played some part, how was the requisition for information to be framed so as to produce results of any real value? These questions, especially the last named, were of such serious mien as to seem at first thought almost unanswerable. Obviously it would be useless to look to any of the great medical associations, county medical societies, or medical bodies of lesser magnitude for the desired figures or estimates. It was no less clear that even the greatest and most experienced medical and surgical specialists would not be competent witnesses, their several experiences of course having been restricted to their respective lines of practice. To a certain extent this same objection apparently would apply to the house staffs of the great hospitals, for the reason that in their case there would certainly be what is known in the insurance world as "adverse selection," or an unquestionable preponderance of experience with the lower strata of humanity with exceptional alcoholic leanings. Were the inquiry to be confined to the ranks of "the general practitioner," that sturdy, old-fashioned body of physicians who have done so much to contribute to the health and happiness of the world, the question might arise as to whether these men had the up-to-date, specialized knowledge of the intricacies of the alcoholic problem necessary to qualify them as competent authorities on the subject at issue.

The elimination of these several groups of pathologic and pathogenic authorities had seemed all but to exhaust the entire panel of medical witnesses when it occurred to me that some of my distinguished medical friends occupying the positions of medical directors of great insurance companies might not only be capable of furnishing the desired information, but, as

a matter of fact, perhaps the best possible authorities on the subject owing to their extensive experience on wholesale lines, so to speak. I take it that all intelligent men, even without the slightest insurance training or experience, by this time are aware of the fact that all applications for life insurance are finally passed upon by the medical directors of the companies in question, these officials constituting the medical court of last resort in so far as the approval or rejection of the application for insurance is concerned. In a lesser degree this same rule applies to the larger casualty or personal accident insurance companies, and in all applications for life or personal-accident insurance there are certain questions regarding the drinking habits of the applicants whose answers to these questions are made part and parcel of the proposed insurance contracts. Necessarily, therefore, the medical directors of these companies are compelled to keep posted, at least in a general way, on the latest knowledge as to the relations of alcohol and human morbidity and mortality, and hence are constantly in close touch with this phase of the alcoholic problem.

Furthermore, the medical director of a large life or accident company annually passes on many thousands of applications, and, the alcoholic habits or experience of the applicant in each case being an important factor in determining whether the application is to be approved or rejected, the medical director of a well-run insurance company might be said to maintain a closer relation with the actual alcoholic habits of the community at large than does any other class of physicians, with the possible exception of those on the staffs of "gold-cure" establishments. For these reasons I concluded that the medical directors of some of the larger insurance companies might prove exceptionally competent witnesses in the proposed quest for an approximation of the mortality of the United States in which alcohol appreciably figured. The source of the desired information being determined, the next and all-important question was just how could the proposed inquiry be so formulated as to bring it within the limitations of the medical directors' field of work and yield tangible results on the basis of their actual experience.

THE BASIC PLAN OF THE INVESTIGATION

The so-called law of average being the bedrock foundation of all sound forms of insurance, and the literature of alcohol and alcoholism apparently indicating that there are almost as many distinct positions as commentators on these subjects, the possibility—not to say the eminent desirability—of in some way averaging the data collected from the medical directors who might be pressed into service in the proposed investigation naturally suggested itself. In the home offices of all well-run life and accident insurance companies carefully compiled records of the causes of policy holders' deaths are kept and interesting tabulations of these records for long stretches of years have been published by some of the larger companies, but in no insurance office, so far as I am aware, are the contributory causes of death systematically recorded. In default of actual records of deaths in the case of which alcohol figured only as a minor factor, of course it would have been impossible for medical directors to furnish the number of deaths directly or indirectly caused by alcohol in the case of their respective companies, and evidently the nearest approach to exact figures at their hands would be in the nature of estimates based on their singularly broad experience in passing on applications and death claims.

It was instantly apparent that the more numerous and the more sharply differentiated the classes on which the estimates were based the more accurate would probably be the final results of these estimates—and the more numerous the available checks on those results. I therefore conceived the idea of calling upon each medical director who might participate in the investigation for his personal, independent estimate of the percentage of male deaths at adult ages directly or indirectly due to alcohol in the case of each of the nominal causes of adult male deaths in which alcohol could possibly have figured to any appreciable extent. The plan so mapped out provided for applying to the total number of male deaths at adult ages in the case of each of these causes the average of the percentage estimates obtained from the medical directors for that cause of death, thus working out the presumptive number of adult male deaths from that nominal cause in which

alcohol really figured, and then by the addition of these totals arriving at a tangible approximation of the total adult male mortality in which alcohol was a factor in the registration area of the United States for which specific mortality figures for recent years were available. With this total as a rationally established basis, it seemed possible that at least a fairly safe approximation of the total alcoholic mortality of continental United States might be calculated.

Having thus tentatively formulated a plan for a pioneer effort at an approximation of the alcoholic mortality of the United States, I consulted Dr. Brandreth Symonds, president of the Association of Life Insurance Medical Directors of America, chief medical director of the Mutual Life Insurance Co. of New York, and for more than 20 years identified with that great company as medical examiner, assistant medical director, medical director, and chief medical director, and requested his frank opinion as to whether in his judgment the proposed plan was practicable and workable, and might be expected to produce results of real value. Dr. Symonds replied that the plan was not only new and novel, but entirely workable and well worth the trying, and that I could count on his hearty cooperation with the proposed investigation. The results of this encouraging decision on the part of so eminent a medical authority of the life insurance world were the investigation and the publication of its results under the title of "The Mortality of Alcohol" in the latter months of 1911.

Dr. Symonds having kindly consented to serve on the medical jury to which the case was to be submitted, I then enlisted the cooperation of two other medical directors of long and broad experience, namely, Dr. Eugene L. Fisk, medical director of the Postal Life Insurance Co., and Dr. William L. Gahagan, medical director of the United States Casualty Co., both of New York City, and secured from each of these three physicians his independent estimates of the percentage of male deaths at adult ages in which alcohol had probably figured as a causative or contributory factor in the case of each of 106 causes of death listed in the mortality statistics for 1908 of the Bureau of the Census, the statistics in question being the latest available when the investigation was commenced. All told, 187

causes and classes of causes of death were listed in the census report in question, but as the preliminary investigation was to be restricted to male deaths at adult ages, 81 of these causes or classes of causes were stricken out as without the scope of the investigation in the judgment of several physicians called upon to pass on the list. For similar reasons the three medical directors of whom percentage estimates were requested were asked to confine their estimates to the probability in the case of male deaths between ages 20 and 74, inclusive, their official experience not including infant or child mortality, and the consensus of medical opinion being that male deaths at age 75 or over in which alcohol appreciably figured practically constituted a negligible element.

THE RESULTS OF THE INVESTIGATION

In the lists of primary causes of male deaths at adult ages submitted to the three medical directors for their independent percentage estimates in each case, the 106 causes in question were broadly classified in three groups, as follows:

Group A. Twenty-eight causes of adult male deaths in which alcohol may have been an important contributory factor and sometimes the principal causative factor.

Group B. Forty-eight causes of adult male deaths in which alcohol may have been a minor contributory cause, or at least a distinctly disturbing factor.

Group C. Thirty causes of adult male deaths in which alcohol was not primary or secondary cause, but may have been a harmful contributory factor.

Without going into needless details regarding the findings in the case of each of these groups, the results of the application of the average of the percentage estimates for each separate cause of death to the total number of male deaths at adult years charged to that cause in each of the three groups may be summarized as follows:

Groups	Total number of male deaths from these causes (ages 20 to 74, inclusive)	Number of male deaths from these causes in which alcohol figured, according to average of physicians' estimates
Group A	73,747	18,337
Group B	107,422	13,664
Group C	17,689	852
Totals	198,858	32,853

The above figures merely state on the broadest possible lines the immediate results of the entirely independent percentage estimates of the three medical directors in the case of each of 106 causes of male deaths at adult ages in the registration area of the United States in 1908, on the basis of which was calculated a statistical approximation of the total alcoholic mortality of both sexes at adult ages in continental United States. The above group totals, of course, make no showing of the individual estimates or of the pronounced differences between the three physicians' estimates in many cases which, in my judgment, materially contribute to the credibility and reliability of the final showings as thoroughly representative of American medical opinion as to the mortality directly or indirectly due to alcohol. The opinions of equally competent physicians as to the part which alcohol plays in modern mortality materially differing, according to their several viewpoints, and the estimates on the averages of which the findings of this investigation are based having been made without so much as the slightest semblance of consultation in any case, it was inevitable that in some cases the estimates would widely vary. Had they not so varied they would not have been representative of American medical opinion on the subject.

It was, therefore, fortunate rather than unfortunate that one of the medical directors whose estimates figured in this investigation proved to be a physician of pronouncedly anti-alcoholic leanings—that is to say, one of the class of physicians who believe alcohol to be a particularly potent mortality factor.

As an inevitable result of this view of alcohol's pathogenic effects, this physician's estimates were almost invariably higher than those of the two other medical directors, so that the averages of the three estimates throughout the tabulation of deaths from 106 different causes probably were fairly representative of ultraconservative, conservative, and pronouncedly anti-alcoholic American medical opinion. In fact, some physicians have expressed the opinion since the publication of the results of the investigation that even were a poll of two or three hundred American physicians to be made and the averages of their percentage estimates applied to the total number of deaths at adult ages in the United States, the final showings of that poll probably would not materially differ from the findings based on the averages of the three medical directors who figured in this investigation. Further proofs of the probable approximate correctness of these findings are hereinafter briefly summarized in this paper.

The tabulation of the preliminary showings above presented indicates that 32,853 of the total of 198,858 adult male deaths from the 106 causes in question were directly or indirectly due to alcohol, or, in other words, that 16.5 per cent. of the total number of deaths in question were deaths in which alcohol presumably played some part. A careful comparison of the number of male and female deaths directly due to alcoholism in the registration area of the United States, and also in New York City, apparently indicating that the male mortality in which alcohol figures in this country must be at least five times as large as the female mortality of this class, and this conclusion being confirmed by every one of the physicians and registration officials to whom the matter was submitted, it seemed entirely safe to assume that the percentage of female deaths at adult ages directly or indirectly due to alcohol would not exceed one-fifth, or 20 per cent., of the male ratio. The 16.5 per cent. of male deaths between ages 20 and 74, inclusive, directly or indirectly due to alcohol in the case of the 106 causes considered being found to constitute about 13.2 per cent. of the total male deaths from all causes at ages 20 and upward, the female mortality in which alcohol presumably figured was consequently calculated on the basis of one-fifth of this per-

centage rate, or 2.6 per cent. of the total female mortality from all causes at ages 20 and upward, and so computed the total adult alcoholic mortality of the registration area of the United States in 1908 apparently reached the total of 38,288 deaths, or 8.4 per cent. of the total mortality from all causes at ages 20 and upward.

The presumptive adult mortality of the registration area in which alcohol figured as a factor in 1908 having been approximately computed, it only remained to apply the percentage figures thus worked out to the estimated population of the remainder of the country, with the adjustment necessary for adapting them to the much larger rural population of the non-registration area, in order to arrive at a statistical approximation of the total mortality of continental United States in which alcohol presumably figured as a causative or contributory factor. Making the necessary allowances for the estimated rural and urban populations of the nonregistration area and the supposedly resultant mortality rates of that area, the computation of the alcoholic mortality of the entire country, worked out on the lines hereinbefore summarized with the averages of the three medical directors' estimates as a basis, fixed the mortality of the United States in 1908 in which alcohol appreciably figured as a factor at 65,897, or in round figures 66,000, this total being about 5.1 per cent. of the supposed total mortality of the country from all causes at all ages, or 7.7 per cent. of the total mortality from all causes at ages 20 and upward. Otherwise stated, this figure indicates that alcohol might be supposed to play some part in about 1 in every 20 deaths at all ages, or in about 1 in every 13 deaths at adult ages (ages 20 and upward). As is stated in the conclusions presented in my book (p. 73), "it should be clearly understood that this figure by no means signifies that alcohol was the direct cause of 66,000 deaths, the number in question presumably including all of the deaths in which alcohol played any appreciable contributory part. Consequently the number of deaths thus computed is not properly comparable with the number of deaths accredited to any particular cause in the annual mortality statistics of the registration area, as in every case those figures deal with deaths immediately due to the cause named."

THE RESULTS MEASURED BY OTHER STANDARDS

According to Capt. Richmond P. Hobson's widely advertised congressional speech and subsequent booklet on "The Great Destroyer," alcohol is responsible for more than 680,000 deaths, or approximately one-half of all deaths from all causes at all ages in continental United States. According to the results of this pioneer investigation of the subject in the United States, alcohol is responsible, directly or indirectly, for not more than 66,000 deaths, or approximately one-twentieth of all deaths from all causes at all ages in continental United States. Both figures are but approximations, but the discrepancy between them is somewhat pronounced. Which of them is apparently more firmly grounded and entitled to more serious consideration? The discussion of the results of my investigation in medical, temperance, and lay periodicals stretching out over very nearly 12 months has failed to bring to light any semblance of a previous investigation of the probable mortality from alcohol in the United States, and it would seem safe to assume that there had been no such previous investigation. There apparently being no prior data on these lines available, the presumptive accuracy or inaccuracy of the conclusions of this investigation, as contrasted with Capt. Hobson's tenfold assumptions, can only be measured by a comparison of the methods by which the two estimates—almost as far apart as the poles—were arrived at, by a checking up with the best foreign data obtainable, and in the light of the most competent, unbiased, American opinion.

The processes of my approximation of 66,000 deaths in the United States in 1908 in which alcohol may have figured as a causative or contributory factor, based on the average of the independent estimates for each of 106 causes of death by the medical directors of three large American insurance companies, have already been sufficiently outlined. Now, as to Capt. Hobson's own statement of the methods by which he arrived at his conclusion that the number of deaths in this class should be fixed at "over 680,000 deaths per year in continental United States." On pages 4 and 5 of the reprint of his lecture on "The Great Destroyer" I find this explanation of the faith that is in him:

It is difficult to say in any particular case whether having alcohol in the system caused a patient to take a disease or caused a patient to die, and alcoholism attributed to men who die in delirium tremens is the only record of death ordinarily kept against alcohol. But the British Government, in conjunction with English life insurance companies, from the records of millions of cases, has been able to determine the death rate of total abstainers and of those who drink.

Statistics compiled by insurance companies show that the death rate for the population at large is 1,000 death per year out of every 61,215 of the population, and that the death rate of total abstainers is 560 per year out of the same number, and for liquor dealers 1,642 death per year out of the same number. These figures, resulting from many millions of cases, can be taken as accurate. They show that 440 deaths out of every 1,000 deaths, nearly one-half of the deaths that occur, are due to alcohol. Applied to this country, over 680,000 deaths per year in continental United States or over 725,000 per year in the United States and its possessions. In other words, alcohol is killing our people at the rate of nearly 2,000 men a day every day in the year.

On the strength of nearly 20 years' experience in the conduct of an insurance magazine, and a fairly comprehensive acquaintance with the records and literature of life insurance, I confidently challenge this statement that "the British Government, in conjunction with English life insurance companies, from the records of millions of cases, has been able to determine the death rate of total abstainers and of those who drink." If the British Government ever has undertaken any such task, it has completely escaped my attention, and I should be very glad to have the date and title of the official record of any such investigation, and the page on which the alleged results as stated by Capt. Hobson are presented. That the bare figures quoted by him were presented in a British "Bluebook" I am well aware, now having before me the three ponderous volumes of the Report of the Inter-Departmental Committee on Physical Deterioration (Cd. 2175, Cd. 2186, and Cd. 2210), published in 1904, in which they appeared, but I therein find positive evidence that Capt. Hobson has entirely misunderstood, and misquoted, the figures in question, which he characterizes as "statistics compiled by insurance companies." In the first place, life insurance companies do not bother with "the death rate for the population at large," their mortality compilations practically being confined to their own respective mortality

experiences. In the second place, the figures cited by Capt. Hobson, and incorrectly cited, were not compiled or presented by the British Government, but were presented as an appendix to the evidence of a Mr. W. McAdam Eccles and a Dr. Robert Jones before the inter-departmental committee. In the third place, as will be seen by reference to page 64 of Volume III of the committee's report, the figures as presented in this appendix actually conveyed a very different meaning from that attributed to them by Capt. Hobson, reading in the report as follows:

COMPARATIVE MORTALITY OF ADULT MALES, PUBLICANS, AND
ABSTAINERS

The registrar general has ascertained that of 61,215 men between 25 and 65 in the community, 1,000 die in one year; but of 61,215 publicans, 1,642 die in one year; but of 61,215 Rechabites (abstainers), 560 die in one year.

The figures for the death rates of "men between 25 and 65 in the community" and for publicans between those ages, I find on pages ix-x of Dr. John Tatham's letter to the registrar general in the Supplement to the Fifty-fifth Annual Report of that official, published in 1897 (C. 8503), but the death rate for Rechabites (abstainers) alleged as above apparently is not included in that voluminous report, and presumably was cited from other sources. Not only are the figures quoted from Dr. Tatham's letter to the registrar general those for the years 1890, 1891, and 1892—or, in other words, 20 years old—but they afford no measure whatsoever of the mortality of alcohol, merely tracing the comparative mortality of publicans between ages 25 and 65 and the general male community between those ages. Even should the death rate cited for Rechabites (abstainers)—the authority for which is not mentioned—have rested on sufficient experience and been so carefully worked out as to entitle it to serious consideration, the comparison of such a death rate among a carefully selected class of men between ages 25 and 65 and the death rate among the general male community at those ages would be equally valueless as a means of measuring the relative mortality of abstainers and nonabstainers, the one presumably being a select

class of insurable risks—and, incidently, total abstainers—and the other, the general run of the male community, including men of all classes, both drinkers and nondrinkers.

As a matter of course, the death rate of a selected, insurable, body of men in any age group might be expected to be materially lower than that of the entire male community in that age group, and consequently Capt. Hobson's novel method of undertaking to measure the mortality properly chargeable to alcohol by subtracting from the death rate of the adult male community at large the alleged death rate of a select, insurable, body of abstainers of like age, and then announcing the difference as the alcoholic death rate, is not only unique but utterly valueless. So computed, his assertion that alcohol is responsible for "over 680,000 deaths per year in continental United States" obviously falls of its own weight, as previously stated. Were it not for the fact that the figure in question was the only specific figure at which the mortality from alcohol in the United States had been fixed in any quarter prior to my recent investigation, and that it had been widely quoted, it would scarcely have been worthy of the actual demonstration of its absurdity on the strength of official records with which I have dignified it.

The ridiculous figure of 680,000 deaths from alcohol per annum in the United States disposed of, the approximation of about 66,000 deaths arrived at as the result of the recent investigation would seem to be entitled to serious consideration as a starting point for further investigations, if fairly comparable with the results of the English investigations of many years since, and the official figures for the towns of Switzerland previously mentioned in this paper, no other standards of comparison apparently being available. At least, such would seem to be the case, unless some tangible, unanswerable arguments against the tentative acceptance of this figure in default of more exact data were to be brought forward. Up to date, to the best of my knowledge, no such arguments have been advanced, the leading medical journals of this country in their review of the published results of the investigation having practically concurred in the conclusion that the final approximation of 66,000 deaths directly or indirectly due to alcohol was

presumably not far away from the actual figure. In so far as the three English investigations of the subject are concerned, but one of them, to wit, that conducted by the Harveian Society of London in 1879-1882, was laid out on such lines as to permit of any comparison of its results with those of my investigation.

As read before the Harveian Society November 16, 1882, and published in the British Medical Journal of January 20, 1883 (Vol. I for 1883, p. 97 *et seq.*), the report of the English investigation in question dealt with returns for 10,000 deaths in the city of London collected from London physicians, and showed that 1,402 deaths, or almost exactly 14 per cent., of the total of 10,000 deaths apparently had been accelerated or partly caused by the abuse of alcohol, or were wholly due to it. About 75 per cent. of the returns in question had come from private practitioners, and the remaining 25 per cent. from workhouse infirmaries, lunatic asylums, hospitals, and inquest reports, and all, it will be remembered, dealt with London mortality. My investigation, on entirely different lines, showed an apparent mortality of about 7.7 per cent. of the total mortality of the United States at adult ages in 1908, as contrasted with the Harveian Society's showing of a mortality of 14 per cent. at adult ages in the city of London in or about 1880. Taking into account the pronounced differences in the periods and fields of the two investigations, how do their findings compare, or, in other words, is the discrepancy in the findings greater than might have naturally been expected? I venture to believe that it is not, and for these reasons:

The English investigation not only dealt with the mortality conditions of a generation ago, but solely with urban mortality, and with the urban mortality of the greatest city in the world. About one-quarter of its figures came from infirmaries, asylums, hospitals, etc.

In the 28 years intervening between 1880 and 1908 the corrected death rate of England and Wales decreased from 19.5 to 14.7, or by all but 25 per cent., and even assuming that the Harveian Society's figure of 14 per cent. of the total adult mortality of London was also a fair measure of the alcoholic mortality of England and Wales in 1880, it would obviously

be unfair to compare the supposed alcoholic mortality of the United States in 1908 with that of England and Wales 28 years earlier. As a well-known matter of fact, in both countries the rural mortality is always much lower than the mortality of the cities, and it would seem fairly assumable that whatever the alcoholic mortality rate of the great city of London might be, the alcoholic mortality rate of the entire United States, with approximately two-thirds rural population, would be materially lower.

Furthermore, Mulhall's statistics show that the per capita consumption of alcohol in the United Kingdom in 1871-1880 was 2.10 gallons as against a per capita consumption of 1.14 gallons in the United States in 1880, and the figures of the Board of Trade of Great Britain and Ireland for 1900 charge the United Kingdom with a per capita consumption of absolute alcohol of 2.08 gallons, as compared with one of 1 gallon for the United States. All these facts would forecast a much lower alcoholic death rate in the United States, as a whole, in 1908 than in London in 1880, and the materially greater amount of female drinking in London than in this country, and the materially greater percentage of known female mortality directly chargeable to alcohol would be certain to make the London alcoholic death rate much higher. In fact, were the ratio of 55.26 female deaths for each 100 male deaths in which alcohol figured, as shown by the Harveian Society's London investigation, applied to the known figures for the registration area's total adult mortality considered in my investigation, the deaths of both sexes at adult ages directly or indirectly due to alcohol would have amounted to 11.2 per cent. of the total adult mortality, as compared with the Harveian Society's figure of 14 per cent. for London in 1880.

In short, taking into account only the more important differences in the conditions governing the two investigations, it would seem that the difference between the Harveian Society's measure of the alcoholic mortality of the city of London in 1880 as 14 per cent. of the total adult mortality, and my approximation of the alcoholic mortality of this entire country in 1908 as 7.7 per cent. of the total adult mortality was no greater than might have been expected. The records for the leading

towns of Switzerland in 1900-1903 suggest that 10.3 per cent. of the deaths among adult males were in whole or part due to alcohol, and that 1.9 per cent. of the deaths among adult females were so due, and taken either separately or jointly these figures do not materially differ from the showings of this investigation for the United States—the Swiss ratio of female to male deaths, or 1.9 to 10.3, being almost identical with my assumption of a ratio of 1 to 5. In conclusion it may be truthfully said, I think, that there is nothing in the English figures of 30 years ago or the Swiss figures of recent years to raise any serious question as to the probable approximate accuracy of the results of this recent investigation in this country.

A SUPPLEMENTAL CONFIRMATION OF THE FINDINGS

An entirely unexpected and exceptionally valuable confirmation of the general showings of my investigation was forthcoming about three months ago in the form of a personal letter and attached tabulation sent to me by my esteemed friend, Dr. Cressy L. Wilbur, chief statistician of the Division of Vital Statistics, Bureau of the Census. Under date of June 26 last Dr. Wilbur wrote me that he had just finished reading my book on "The Mortality of Alcohol," and added:

It may interest you to see some estimates that I made myself before examining the averages or individual opinions (of the three medical directors on whose percentage estimates the findings of the investigations were based). Subsequently I added in red ink the averages, so that you can conveniently compare them with my offhand estimates. Of course, I look at it from a somewhat different point of view, regarding not merely the form of the term and its medical significance, but the kind of cases that were included under such term in the course of the practical compilation of causes of death. Nevertheless, on the whole, I think there is a very remarkable correspondence, and I should, of course, be disposed to modify certain percentages of my own to correspond with the general consensus of opinion.

The tabulation attached to Dr. Wilbur's letter bore at its head a note to the effect that "the estimates below were made before examining the tables (before even turning over the pages on which they appear or reading the headings or any part thereof) and are therefore entirely uninfluenced by the ratings

given therein." Then followed his entirely independent percentage estimates for each cause of death, and, as stated in his letter, the average percentage in each case as presented in the tables in my book was subsequently added in red ink. A bird's-eye view of the surprising concurrence, in the main, of Dr. Wilbur's estimates, with the averages of the three medical directors' estimates, is presented in the following tabulation of the figures for all causes of death to which my investigation charged as many as 500 male deaths between ages 20 and 74, inclusive, in the registration area of the United States in 1908.

Causes of Death	Total male deaths between ages 20 to 74, inclusive, from these causes, in registration area of the United States in 1908	Male deaths from these causes, between ages 20 to 74, inclusive, apparently due in whole or part to alcohol			
		According to averages of medical directors' estimates		According to the estimates of Dr. Wilbur	
		Per Cent	Number	Per Cent	Number
Bright's disease.....	17,513	30	5,254	40	7,005
Tuberculosis of lungs.	33,900	12	4,068	10	3,390
Heart disease.....	22,887	16	3,662	20	4,577
Pneumonia (lobar and unqualified).....	14,044	22	3,090	10	1,404
Cirrhosis of liver. ...	4,123	67	2,762	75	3,092
Apoplexy.....	11,748	22	2,585	30	3,524
Alcoholism.....	2,025	100	2,025	100	2,025
Suicide.....	6,035	23	1,388	20	1,207
Diseases of arteries...	2,803	23	645	40	1,121
Other accidental injuries.....	5,163	10	516	5	258
Paralysis.....	2,329	22	512	25	582
Totals	122,570	21.6	26,507	23	28,185

The difference of 1,678 deaths between the book totals and Dr. Wilbur's totals for the 11 more important causes of death above listed amounts to 6.33 per cent., and, making allowance for certain minor causes of death which Dr. Wilbur has included in his percentage estimates but which were not included in the medical directors' estimates, the total number of adult deaths in continental United States in 1908 in which alcohol presumably played some part according to Dr. Wilbur's esti-

mates, would have been about 71,600, as compared with the approximation of about 66,000, suggested by the report of my investigation. This difference, in other words, would have been one of less than 9 per cent. of the total tentatively fixed on the basis of the three medical directors' estimates, or considerably less than 1 per cent. of the presumptive total mortality at age 20 and upward in the United States in 1908. It would seem that Dr. Wilbur's statement in his letter to the effect that "on the whole, I think there is a very remarkable correspondence," was an entirely justifiable summary of the comparison of the two sets of estimates so entirely independent and made on such radically different bases. Of course, Dr. Wilbur's estimates were in no sense official, but were made in his purely personal capacity, but coming from such an expert source they seem to me to shed a flood of light on the probable approximate accuracy of the results of my investigation, and I have been more than glad to present them in connection with this paper, with Dr. Wilbur's express permission.

As stated in the introduction to my book, "At best, however, the results of any such inquiry can be but an approximation, and, as a matter of course, any one of the estimates or numerical conclusions presented in the tables accompanying this paper is fairly open to competent analysis and discussion. If it can be proven incorrect, the sooner it is disproved the better."

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